WHAT IS CLAIMED IS:

1.   For a digital valve positioning system comprising a valve, a valve controller having a controller microprocessor and a controller memory, a valve actuator having an output coupled to the valve to control the position of the valve over a range of motion in response to an output from the valve controller, and a first position sensor for determining the position of the valve actuator, an intelligent limit switch for generating a limit switch state signal indicative of a state of the valve being above or below a threshold set point, the limit switch comprising:

a second position sensor generating an output signal indicative of the position of the valve;

a limit switch memory;

a limit switch microprocessor communicatively coupled to the limit switch memory;

a communication link between the controller microprocessor and the limit switch microprocessor for transferring the set point data from the controller to the limit switch, wherein the limit switch microprocessor includes a first limit switch microprocessor output, the limit switch microprocessor being responsive to the second position sensor output signal and the set point data stored in the limit switch memory to generate the state signal at the first limit switch microprocessor output.

2.   The limit switch of claim 1 wherein the location of the threshold set point is defined by threshold set point switch data.

3.   The limit switch of claim 1 including an operators interface communicatively coupled to the controller microprocessor for manipulating the threshold set point switch data.

4.   The limit switch of claim 2, wherein the threshold set point data is expressed as a percentage of the range of motion of the valve.

5.   The limit switch of claim 1, wherein the communications link is optically isolated.

6. The limit switch of claim 1 wherein the limit switch operates independent of the controller.

7. The limit switch of claim 1 wherein the threshold set point is such that the state of the limit switch microprocessor output indicates that the valve is fully open.

8. The limit switch of claim 1 wherein the threshold set point is such that the state of the limit switch microprocessor output indicates that the valve is fully closed.

9. The limit switch of claim 1 wherein the state of the limit switch microprocessor output indicates whether the valve position is above or below a predetermined position between fully open and fully closed.

10. The limit switch of claim 1 wherein the operators interface includes a display indicating the state of the limit switch.

11. The limit switch of claim 10 wherein the display is an LCD display.

12. The limit switch of claim 1 including a first limit switch output coupled to the first limit switch microprocessor output for generating a first limit switch output signal indicating the state of the limit switch.

13. The limit switch of claim 12 wherein the first output signal is a current control signal.

14. The limit switch of claim 13, wherein the current control signal is a 1-4 mA current control signal.

15. The limit switch of claim 13 wherein power for the limit switch is derived from the current control signal.

16. The limit switch of claim 12 wherein:

the operators interface is communicatively coupled to the controller memory for entering second limit switch set point data defining a second threshold set point;

the isolated communication link transfers the second limit switch set point data from the controller memory to the limit switch memory; and

the limit switch microprocessor includes a second limit switch microprocessor output, the second limit switch microprocessor output being responsive to the second position sensor output signal and the second limit switch set point data stored in the limit switch memory to generate a second state signal, indicative of a second state of the valve being above or below the second threshold set point, at the second limit switch microprocessor output.

17.   The limit switch of claim 16, including a second output coupled to the limit switch microprocessor second output for generating a second output signal indicating the state of the second limit switch.

18.   The limit switch of claim 17, wherein the second output signal is a current control signal.

19.   The limit switch of claim 11, wherein the second limit switch output is isolated from the first limit switch output.

20.   The limit switch of claim 19, wherein the second output signal is optically isolated from the limit switch microprocessor.

21.   The limit switch of claim 1 wherein the controller memory includes calibration data defining the range of motion of the valve, and the limit switch data defines the location of the threshold set point as a percentage of the range of motion.

22.   For a digital valve positioning system comprising a valve, a valve controller having a controller microprocessor and a controller memory, a valve actuator having an output coupled to the valve to control the position of the valve over a range of motion in response to an output from the valve controller, and a first position sensor for determining the position of the valve, an intelligent limit switch for generating a limit switch state signal indicative of a state of the valve being above or below a threshold set point, the limit switch comprising:

an operators interface communicatively coupled to the controller microprocessor for entering limit switch set point data defining the location of the threshold set point into the controller memory;

a second position sensor generating an output signal indicative of the position of the valve;

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a limit switch memory;

a limit switch microprocessor communicatively coupled to the limit switch memory;

an optically isolated communication link between the controller microprocessor and the limit switch microprocessor for transferring the limit switch set point data from the controller memory to the limit switch memory, wherein the limit switch microprocessor includes a first limit switch microprocessor output, the limit switch microprocessor being responsive to the second position sensor output signal and the limit switch set point data stored in the limit switch memory to generate the state signal at the first limit switch microprocessor output; and

a first limit switch output coupled to the first limit switch microprocessor output for generating a first limit switch output signal indicating the state of the limit switch.

23.   The limit switch of claim 22 wherein the first output signal is a current control signal.

24.   The limit switch of claim 22 wherein the operators interface includes a display indicating the state of the limit switch.

25.   The limit switch of claim 24 wherein the display is an LCD display.

26.   The limit switch of claim 22 wherein:

the operators interface is communicatively coupled to the controller microprocessor for entering, into the controller memory, second limit switch data defining the location of a second threshold set point defining a second threshold set point;

the isolated communication link transfers the second limit switch set point from the controller memory to the limit switch memory;

the limit switch microprocessor includes a second limit switch microprocessor output, the limit switch microprocessor being responsive to the second position sensor output signal and the second limit switch set point data stored in the limit switch memory to generate a second state signal, indicative of a second state of the valve being above or below the second threshold set point, at the second limit switch microprocessor output; and

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the limit switch includes a second output coupled to the limit switch microprocessor second output for generating a second output signal indicating the secondary state of the limit switch.

27. The limit switch of claim 26, wherein the second output signal is a current control signal.

28. The limit switch of claim 26 wherein the second limit switch output is isolated from the first limit switch output.

29. The limit switch of claim 26 wherein the second output signal is optically isolated from the limit switch microprocessor.

30. The limit switch of claim 22 wherein the controller memory includes calibration data defining the range of motion of the valve, and the limit switch data defines the location of the threshold set point as a percentage of the range of motion.